

Claims

- [c1] A system for calculating distances to objects within three-dimensional space using an angled axis machine vision system comprising:
 - a first camera;
 - a second camera; and,
 - a camera mount coupled with said first camera and said second camera wherein said camera mount is rotated in a first axial angle between 0 and 90 degrees about a first axis.
- [c2] The system of claim 1 wherein said first axial angle is substantially 45 degrees.
- [c3] The system of claim 1 wherein said first axial angle is substantially 37 degrees.
- [c4] The system of claim 1 wherein said first axial angle is substantially 29 degrees.
- [c5] The system of claim 1 wherein said camera mount is rotated in a second axial angle between 0 and 90 degrees about a second axis orthogonal to said first axis.
- [c6] The system of claim 1 wherein said camera mount is

statically mounted to a support wherein said first axial angle is fixed.

[c7] The system of claim 1 wherein said camera mount is rotatably mounted to a support wherein said first axial angle is adjustable.

[c8] The system of claim 7 wherein said camera mount is rotated after a first set of pictures is taken and wherein a second set of pictures is taken and used to correlate a first set of distance calculations derived from said first set of pictures with a second set of distance calculations derived from said second set of pictures.

[c9] The system of claim 1 further comprising:
a third camera;
a fourth camera; and,
said camera mount further coupled to said third camera and said fourth camera wherein said third camera and said fourth camera are rotated in a third axial angle between 0 and 90 degrees about said first axis.

[c10] The system of claim 9 wherein said third axial angle and said first axial angle comprise a fixed angle between said third axial angle and said first axial angle.

[c11] The system of claim 9 wherein said third axial angle and said first axial angle comprise an adjustable angle be-

tween said third axial angle and said first axial angle.

[c12] A method for calculating distances to objects within three-dimensional space using an angled axis machine vision system comprising:
attaching a first camera and a second camera to a camera mount;
rotating said camera mount in a first axial angle between 0 and 90 degrees about a first axis;
obtaining a first picture from said first camera;
obtaining a second picture from said second camera;
and,
calculating a distance to an object.

[c13] The method of claim 12 wherein said first axial angle is substantially 45 degrees.

[c14] The method of claim 12 wherein said first axial angle is substantially 37 degrees.

[c15] The method of claim 12 wherein said first axial angle is substantially 29 degrees.

[c16] The method of claim 12 further comprising:
rotating said camera mount in a second axial angle between 0 and 90 degrees about a second axis orthogonal to said first axis.

- [c17] The method of claim 12 further comprising:
mounting said camera mount statically to a support
wherein said first axial angle is fixed.
- [c18] The method of claim 12 further comprising:
mounting said camera mount rotatably to a support
wherein said first axial angle is adjustable.
- [c19] The method of claim 12 further comprising:
rotating said camera mount after said obtaining said first
picture and said obtaining said second picture;
obtaining a third picture from said first camera; and,
obtaining a fourth picture from said second camera.
- [c20] The method of claim 19 further comprising:
determining if said first picture and said second picture
or said third picture and said fourth picture comprise
fewer lines parallel to a direction from said first camera
to said second camera.
- [c21] The method of claim 19 further comprising:
comparing a first set of distance calculations derived
from said first picture and said second picture with a
second set of distance calculations derived from said
third picture and said fourth picture.
- [c22] The method of claim 19 further comprising:
deriving a set of distance calculations from said first pic-

ture, said second picture, said third picture and said fourth picture.

- [c23] A system for calculating distances to objects within three-dimensional space using an angled axis machine vision system comprising:
 - means for attaching a first camera and a second camera to a camera mount;
 - means for rotating said camera mount in a first axial angle between 0 and 90 degrees about a first axis;
 - means for obtaining a first picture from said first camera;
 - means for obtaining a second picture from said second camera; and,
 - means for calculating a distance to an object.
- [c24] The system of claim 23 wherein said first axial angle is substantially 45 degrees.
- [c25] The system of claim 23 wherein said first axial angle is substantially 37 degrees.
- [c26] The system of claim 23 wherein said first axial angle is substantially 29 degrees.
- [c27] The system of claim 23 further comprising:
 - means for rotating said camera mount in a second axial angle between 0 and 90 degrees about a second axis or—

thogonal to said first axis.

- [c28] The system of claim 23 further comprising:
means for mounting said camera mount statically to a support wherein said first axial angle is fixed.
- [c29] The system of claim 23 further comprising:
means for mounting said camera mount rotatably to a support wherein said first axial angle is adjustable.
- [c30] The system of claim 23 further comprising:
means for rotating said camera mount after said obtaining said first picture and said obtaining said second picture;
means for obtaining a third picture from said first camera; and,
means for obtaining a fourth picture from said second camera.
- [c31] The system of claim 30 further comprising:
means for determining if said first picture and said second picture or said third picture and said fourth picture comprise fewer lines parallel to a direction from said first camera to said second camera.
- [c32] The system of claim 30 further comprising:
means for comparing a first set of distance calculations derived from said first picture and said second picture

with a second set of distance calculations derived from said third picture and said fourth picture.

[c33] The system of claim 30 further comprising:
means for deriving a set of distance calculations from said first picture, said second picture, said third picture and said fourth picture.